

## ECUADOR

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**E**cador is the smallest Andean country in South America. It is also one of the continent's largest exporters of crude oil. High oil prices in 2002 and 2003 helped the country recover from the severe economic crisis of 1999, and oil revenues now provide 40% of export earnings and account for about one third of government revenue. Growth in real GDP, however, declined from 5.4% in 2001, to about 1.7% in 2003. Continued IMF support during this recovery process is expected shortly, with provision for a new standby loan facility.

Ecuador's proven crude oil reserves, in the five main Amazonian oilfields, stood at 4.6 billion barrels in January 2004, and there is significant potential for more. Total oil production rose to 500,000 bbl/d in late 2003. This reflected the completion of a second trans-Andean pipeline, the Oleoducto de Crudos Pesados (OCP), in September 2003. The OCP eliminates a transportation bottleneck and should facilitate development of new fields. Production by Petroecuador, the state-owned oil company, however, slipped from 256,000 bbl/d in 1999, to 204,000 bbl/d in 2003. This reduction is a result of insufficient investment in the ageing state-owned fields, and is blamed on IMF-imposed cutbacks in government spending.

On the political front, the government's popularity has declined steadily since the surprise election result of November 2002, when left-leaning Lucio Gutiérrez, a former coup-leader, beat conservative banana billionaire Alvaro Noboa. The government PSP party's success was gained through alliances with Pachicutik, representing the indigenous population, and the radical left-wing MPD party. Both were rewarded with key ministerial appointments in the government. However, the alliance with Pachacutik did not last; pre-election aspirations were left unfulfilled, and in September 2003 it broke off relations with the government. Mr Gutiérrez was subsequently widely criticised for the appointment of family members and military friends to key posts. These included Carlos Arboleda, the controversial Minister for Energy and Mines, who was forced to resign in April 2004. The recent political disarray has been exploited by the right-leaning Partido Social Cristiano (PSC) party. PSC represents the powerful economic interests of the coastal region, including Guayaquil, the largest city and main industrial centre of Ecuador. The PSC has obtained significant leverage within the government in return for its support in these troubled times.

Ecuador has a modern mining law and a diverse inventory of mineral deposit types, including: copper and gold-copper porphyries; high- and low-sulphidation epithermal gold deposits; two gold-rich VMS deposits; and a large gold-skarn district. The country's mineral potential lies mostly within the Andes. These mountains form the 600 km-long backbone of Ecuador, rising to over 6,000 m, and include Cotopaxi, the world's highest active volcano.

Ecuador has no significant mining industry, but two projects at the feasibility stage could form the basis of an embryonic mining industry. Current gold production is estimated at 8 t, derived largely from informal vein operations in the Portovelo-Zaruma and Ponce Enríquez districts of the Western Cordillera. The Portovelo-Zaruma district has produced an estimated 4 Moz of gold since the Colonial period. However, the lack of environmental controls over the more recent mining in this historic district has tarnished the image of mining within Ecuador.

The country's principal gold deposits are located in the Western Cordillera, which comprises mainly Tertiary volcanic rocks. The most advanced project is Río Blanco, located about 40 km west of Cuenca, and owned by International Minerals Corporation (IMC). This project comprises several low-sulphidation epithermal veins and breccias, characterised by bonanza-grade gold and silver mineralisation.

In October 2003 the company released the results of an independent scoping study undertaken by BISA (part of the Peruvian Buenaventura group) on the Alejandra vein. This 500 m-long structure, up to 30 m wide, has been proved to at least 300 m below surface. IMC estimated a diluted inferred resource of 744,000 t at an average grade of 18.3 g/t Au and 146 g/t Ag. A feasibility study is being undertaken by Micon International of Canada, and results are expected early in 2005. Water Management Consultants of Chile is undertaking the EIA.

As part of this study, IMC is completing a 10,000 m infill drilling programme, and earlier this year reported results which included some high-grade intersections (eg, 2.1 m at 27.4 g/t Au and 116 g/t Ag in hole BC-94; 7.4m at 25.2 g/t Au and 51g/t Ag, (including 0.4 m at 360 g/t Au and 656 g/t Ag, in BC-95; 0.8 m at 44.2 g/t Au and 275 g/t Ag in BC-98; 3.0 m at 16.8 g/t Au and 199 g/t Ag in BC-102; and 5.2m at 32.5 g/t Au and 376 g/t Ag in BC-104). Later, the company will turn its attention to other targets in the project area, such as the Dorada zone, located about 700 m south of the Alejandra Vein and about 600 m lower in elevation. A short adit at Dorada completed earlier this year intersected a faulted vein with a true width of about 3.5 m and possessing average grades of 90.8 g/t Au and 643 g/t Ag.

IMC is also updating the 1997 pre-feasibility study on the Gaby gold porphyry and the prefeasibility study conducted by Cambior Inc on the adjacent Papa Grande deposit (now owned by IMC). The Gaby-Papa Grande deposit, located in the foothills of the Western Cordillera near Machala, is Ecuador's largest undeveloped gold resource. The 1997 studies estimated an inferred mineral resource of 5 Moz in the two adjacent ore bodies with 211 Mt at an average grade of 0.82 g/t Au (0.5 g/t cut-off). Gaby lies close to the Ponce Enríquez gold vein district, which has produced about 1-2 Moz of gold since the early 1980s.

The Cangrejos project, located 30 km south of Gaby, was explored by Newmont Mining Corp in the late 1990s. This gold-copper porphyry has similar potential to Gaby, but no resource figure is available.

Iamgold Corp continues work at Quimsacocha, a high-sulphidation gold prospect located 90 km south of Cuenca. Previously explored by Newmont and Cogema of France, it contains extensive low-grade disseminated gold mineralisation and a series of high-grade gold and silver-bearing quartz-enargite veins. IAMGOLD reported the results from 6,000 m of diamond drilling in early 2004. One of the better intersections was 2.1 m at 34.8 g/t Au and 260 g/t Ag in Vein 11. Follow-up work will focus along strike from Vein 11 and test six other veins. The margin of the Tres Lagunas diatreme will also be tested.

Iamgold continued work on a 50:50 joint venture with Gold Fields Ltd, targeting epithermal gold mineralisation in a 2.2 million km<sup>2</sup> area of predominantly Miocene volcanics in southeast Ecuador. The JV includes IMC's Cañicapa high-sulphidation target, where a 3,000 m reverse-circulation drilling programme was completed earlier this year. Significant zones of vuggy silica were intersected from which assay results are awaited. IAMGOLD also has a joint venture with Minera Cachabi on El Mozo, a high-sulphidation gold target in Azuay Province. Reviewing the company's exploration work in the region, Iamgold's exploration director Dennis Jones, predicted that Ecuador will be the next 'hotspot' in South America.

In the Eastern Cordillera (Cordillera Real), Corriente Resources Inc continued work on the Corriente copper belt. This new porphyry copper district, discovered by Gencor/Billiton in the mid-1990s, is related to Jurassic granites. The belt contains three known copper porphyries, which together contain an estimated 600 Mt at an average grade of 0.81% Cu, with some gold-molybdenum credits. The district contains several untested targets. Amec is undertaking a feasibility study on the Mirador deposit, scheduled for completion in mid-2004. A 2003 scoping study at Mirador, which gave an estimated resource of 98 Mt averaging 0.78% Cu, demonstrated the economic feasibility of a 20,000 t/d operation at a capital cost of US\$134 million.

Dynasty Metals and Mining is a new arrival on the exploration scene in Ecuador. It was established in 2003 to focus on precious metals exploration in southern Ecuador. The company owns part of the Chinapintza gold-vein deposit, where TVX (now Kinross Gold Corp) estimated some 215,000 oz gold and 1.4 Moz silver. Dynasty recently reported four new veins discoveries, including the Teniente Vein, which has a strike length of over 500 m. Channel samples yielded gold grades of 9.8-57 g/t and silver grades of 225-2,500 g/t, with an estimated average true width of 0.6 m. The company also owns the Dynasty concession in Loja Province, southern Ecuador. This shows large areas with reported porphyry-style alteration and containing gold- and silver-bearing veins. The company also controls a significant part of the historic Portovelo-Zaruma mesothermal vein gold camp.

Aurelian Resources, another recent arrival in Ecuador, has reported promising results from the Condor project in the Eastern Cordillera of southeast Ecuador. Eight diamond drill holes were completed earlier this year to test a 2 km-long gold soil anomaly in the Bonzas-Las Peñas zone. These

intersected broad zones of mineralisation including 101 m of 2.3 g/t, and 110 m of 1.3 g/t gold. The mineralisation, which is described as epithermal low-sulfidation type, follows a district-scale north-south fault zone.

The Nambijas gold skarn deposit, also located in south/east Ecuador, has produced more than 1 Moz of gold from bonanza-grade pods since it was discovered in the early 1980s. Nambijas is now worked out, but Sultana del Condor is currently exploiting a high-grade skarn nearby, with a reported drill-inferred resource of close to 0.5 Moz of gold.

Sultana also own La Plata, a gold-rich polymetallic deposit located 160 km west-southwest of Quito on the western flanks of the Andes. The drill-indicated resource stands at 686,000 t averaging 6.3 g/t Au, 76 g/t Ag, 5.7% Cu and 5.1% Zn. La Plata is one of two Kuroko-type VMS-type deposits hosted by dacitic rocks that are part of a Palaeogene oceanic arc. Amec is finalising a scoping study at La Plata and results are expected shortly.

Elsewhere in the Macuchi-La Plata volcanic belt, Toronto-listed Largo Resources Ltd has begun a two-phase, US\$1.5 million exploration programme over two years in order to earn a 51% interest in the Macuchi property. There are four major targets: Mercedes, Esperanza, Minchoa 1 and Minchoa 3. In the 1930s, Cotopaxi Mining Co discovered the Mercedes deposit, and in the early 1940s some 435,000 t was mined averaging 11.5 g/t Au, 4.7% Cu and 68 g/t Ag. Diamond drilling at Mercedes has begun.

In conclusion, Ecuador has several advanced exploration projects that have the potential to form the basis of a modern mining industry. This section of the Andes is well endowed with a range of mineral deposit types, but is still relatively under-explored. The few exploration companies that have persisted here have all been rewarded with promising discoveries;- and more should follow.